Remarks/Arguments

Claims 3, 7, and 10 to 16 remain in the application.

Equation 1.4 is replaced to include the middle term which was inadvertently omitted in the original application. This equation is not used in practicing the invention but is presented merely as a mathematical exposition.

The original Abstract has been cancelled and replaced with a new Abstract which better describes the invention and does not exceed the 150-word limit.

Consonant with the Examiner's comment in paragraph 17 of the Office Action Claims 10 and 11 have been rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 12 is dependent upon Claim 11. It is respectfully submitted that Claims 10 to 12 should be deemed allowable.

Claim 1 is cancelled by this amendment and is replaced by independent Claim 13 which includes the limitations of Claims 2 and 4 and better defines the invention. Claim 5 is cancelled by this amendment and is replaced by independent Claim 14 which includes the limitations of Claims 6, 8 and 9 and better defines the invention. New claims 15 and 16 are original Claims 11 and 12 made dependent on new Claim 14.

Claims 1 to 4 stand rejected under 35 USC 112, first paragraph, as failing to comply with the enablement requirement. It is respectfully suggested that the specification does enable one skilled in the art to practice the invention without undue experimentation. Specifically, at page 3, lines 18 to 19, reads, in relevant part, that "The changes in the CPs [communications path] are executed either automatically by switches or routers.... Page 7, lines 6 to 19 describe a device for practicing the invention.

Therefore, it is respectfully submitted that device claims 3 and 13 comply with the requirements of 35 USC 112, first paragraph.

Claims 1 to 4 stand rejected under 35 USC 112, second paragraph, as being indefinite. Claim 1 is cancelled by this amendment and Claim 13 is substituted therefor better defining the elements of a device which Applicant claims as his invention. Therefore, it is respectfully submitted that device claims 3 and 13 comply with 35 USC 112, second paragraph.

Claims 1, 2, 4 to 6, 8 and 9 stand rejected under 35 USC 102(e) as being anticipated by Bawa et al (US 6,697,333). Claim 3 stands rejected under 35 USC 103(a) as being unpatentable over Bawa et al in view of Yamamoto et al (US 4,991,204). Claim 7 stands rejected under 35 USC 103(a) as being unpatentable over Bawa et al in view of Amerga et al (US 6,711,420).

The present invention relates to decreasing the length of routes in packet switched networks. In a packet switched communications network, each node of the network attempts to ensure that any packet it receives is sent to the intended node. The packet may have to travel through numerous nodes in order to reach its final destination. Each time a packet travels from one node to another node, it is said to have "hopped" from node to node. A primary goal of packet switched communications networks is to minimize the time delay between the sending and the receiving of a message. One factor contributing to the delay is the number of hops a packet must make prior to arriving at its destination node. The sequence of nodes or links through which a packet must travel going from a source node to a destination node is referred to as the "communications path". Communication paths are changed over time primarily due to congestion or failures detected on certain network elements. Excessively long communication paths are referred to as out-of-kilter paths. Communication paths that are not excessively long are

referred to as in-kilter paths. The present invention provides a method of reassigning communication paths to minimize the number of out-of-kilter paths.

Each link in the network has a bandwidth capacity constraint. The network serves many communications paths, each path has a required load in terms of bandwidth capacity units. Some of these paths may be excessively long in terms of number of hops (referred to as out-of-kilter). Most are not excessively long (referred to as in-kilter).

The claimed method reroutes out-of kilter communications paths to different routes so that they become in-kilter paths. The claimed invention allows rerouting of up to a specified number of in-kilter communications path to different routes, while keeping them in-kilter, so that an out-of-kilter communications path can be rerouted and become in-kilter. This is very important in highly utilized networks since otherwise many out-of-kilter communications paths could not be rerouted.

For each out-of-kilter path the method determines an ordered sub-sequence of up to, say, n communication paths, where all, except the last path, specify reroutes of in-kilter paths and the last one specifies reroute of an out-of-kilter path. The subsequences are then combined to form a single ordered sequence that is comprised of all the communications paths in all the subsequences The reroutes (also referred to as reassignments) are executed one at a time, and after each execution none of link capacities can be violated, not even temporarily.

Bawa et al. (US 6,697,333)

Bawa et al provides a method for routing a communications path. For each link of the network the amount of already used bandwidth is specified as input, but no capacity limit of the bandwidth that can be used on the link is imposed. The method routes a new requested communications path by finding a route that has the smallest cost

(if link cost parameters are specified), or minimum number of hops, or smallest average load that already is on the path (leading to more balanced loads). Since there are no capacity limits imposed on links, the issue of rerouting existing paths in order to create capacity for another path does not exist. That is, Bawa et al describes selecting the path with the smallest current average load, but fails to teach or even suggest that the combination of the existing load and new load not exceed a link capacity. In contrast, Applicant claims executing the reassignments ... and none of the link capacity constraints is violated after executing each of the reassignments. Bawa et al also fails to consider reassigning existing in-kilter communications paths. Bawa et al teaches the solution to a very different, much simpler routing problem. Therefore, it is respectfully submitted that claims 13 to 16 should be deemed allowable over Bawa et al.

Yamamoto et al. (US 4,191,204)

Yamamoto et al discloses updates of the set of available reroutes and resends them to each switching node.

Yamamoto et al describes finding an available route among possible candidates. The method searches in some preference order until it finds a feasible route that has enough spare capacity (an available trunk), or concludes that no route is available with free capacity on all links on that route. If failed to find, it may retry the process from the start.

Again, there is no notion of rerouting (reassigning) existing communications paths to other routes in order to generate capacity for a new communications path searching for a feasible route.

Claim 3 is a dependent claim dependent upon Claim 13. Since Claim 13 should be deemed allowable for the reasons set forth above, it is respectfully submitted that Claim 3, which is dependent upon Claim 13, should likewise be deemed allowable over Bawa et al and Yamamoto et al.

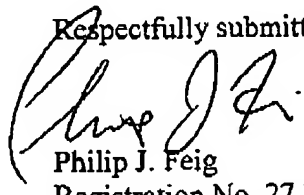
Amerga et al. (US 6,711,420)

Claim 7 claims a constraint in Applicant's method, namely, that the number of communications paths that will be reassigned according to the ordered sequence is less than a predetermined number.

Amerga et al describes finding a path-list in a wireless network. Amerga et al is trying to solve a different problem than that of Applicant. Amerga et al creates a path list of a limited size which limits the search for a wireless connection and Applicant creates a limited sized ordered sequence of reroutes. Amerga et al reads at column 5 lines 49 to 54 that "finding more than three strongest is ineffectual because only three fingers are available for assignment...." Applicant claims in Claim 7 is less than a predetermined number. The number is not limited to a physical requirement but rather can be any practical value. Amerga et al discloses a totally different problem, different application, and different solution method from the claimed invention. Therefore, it is respectfully submitted that Claim 7 should be deemed allowable over Bawa etal and Amerga et al.

Reexamination, reconsideration and favorable allowance of Claims 3, 7, and 10 to 16 in the application are respectfully solicited.

Respectfully submitted,



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